Pesticide Monitoring Program Fiscal Year 2013 Pesticide Report

U.S. Food and Drug Administration

http://www.fda.gov/Food/FoodborneIllnessContaninants/Pesticides/default.htm

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Foreword

This report summarizes the results of the U.S. Food and Drug Administration's (FDA or the Agency) pesticide monitoring program for fiscal year (FY) 2013. Eight of the previous reports were published in the *Journal of the Association of Official Analytical Chemists and the Journal of AOAC International*; these presented results from FY 1987 through FY 1994. Subsequent results and reports through FY 2012 are published on FDA's website at http://www.fda.gov/Food/FoodborneIllnessContaminants/Pesticides/default.htm. This report includes findings obtained during FY 2013 (October 1, 2012 through September 30, 2013) under regulatory monitoring along with selected Total Diet Study (TDS) findings.

In the early 1990s, FDA conducted comprehensive incidence and level monitoring studies of four major foods and published the results[1, 2]. Due to resource constraints, incidence and level monitoring for pesticide residues conducted by FDA's field laboratories, which were typically non-regulatory in nature, have been replaced by regulatory based "focused sampling." Incidence and levels of pesticide residue data are provided by FDA's TDS program and the United States Department of Agriculture's (USDA's) Pesticide Data Program (PDP). The TDS program analyzes market baskets of about 270 foods four times per year.

Results in this and earlier reports continue to demonstrate that levels of pesticide residues measured by FDA in the U.S. food supply are generally in compliance with the U.S. Environmental Protection Agency's (EPA's) permitted pesticide uses and tolerances.

FDA Pesticide Monitoring Program

Three federal government agencies share responsibility for the regulation of pesticides. The U. S. Environmental Protection Agency (EPA) registers (i.e., approves) the use of pesticides and establishes tolerances, i.e., the maximum amounts of residues that are permitted in or on a human or animal food[3]. FDA is charged with enforcing tolerances in both imported foods and in domestic foods shipped in interstate commerce, except for meat, poultry, and certain egg products for which the Food Safety and Inspection Service (FSIS) of the U.S. Department of Agriculture (USDA) is responsible,. FDA also acquires data on particular commodity and pesticide combinations by carrying out market basket surveys under the Total Diet Study (TDS).

Regulatory Monitoring

FDA samples individual lots of domestically produced and imported foods and analyzes them for pesticide residues to enforce the tolerances established by EPA. Domestic samples of foods produced and held for sale in the U.S. are typically collected close to the point of production in the distribution system, i.e., at growers, packers, and distributors. Import samples are collected when products are offered for entry into U.S. commerce. Although processed foods are also included, the emphasis of FDA's sampling is on the raw agricultural product, which is typically analyzed as the unwashed, whole (unpeeled), raw commodity. For domestic foods, if illegal pesticide residues are found at a level above EPA tolerances or FDA Action Levels (guideline levels for unavoidable residues of cancelled pesticides that persist in the environment), or residues are found at a level of regulatory significance for pesticides for which EPA has not established a tolerance on that food commodity, the lot of food, as available, is removed from commerce. FDA also has the authority to issue Warning Letters to the responsible growers and invoke other sanctions such as seizure or injunction to correct the cause of the violation. Imported shipments with illegal residues are refused entry into U.S. commerce. Firms may be placed under an Import Alert (a listing is available at http://www.accessdata.fda.gov/cms_ia/ialist.html) and "Detention Without Physical Examination," or DWPE, may be invoked for future imported shipments of that firm's commodity based on the finding of a single violative shipment. Congress has authorized FDA to refuse admission of regulated articles based on information, other than the results of examination of entries per se, that causes an article to appear to violate the Federal Food Drug and Cosmetic Act (FFDCA). Entries of imported foods which are suspected of containing illegal pesticide residues based on the results obtained from previous examinations of the same foods may be considered to appear to violate the FFDCA. DWPE can be applied to product from specific growers, manufacturers, or shippers, or to a geographic area or country if the problem is demonstrated to be sufficiently broad- based. FDA's Import Alerts describe current DWPEs for pesticide residues and other food issues. There are currently four Import Alerts that address food products that are under DWPE for pesticides:

- Import Alert 99-05, "Detention Without Physical Examination of Raw Agricultural Products for Pesticides"
- Import Alert 99-08, "Detention Without Physical Examination of Processed Foods for Pesticides"
- Import Alert 99-14, "Countrywide Detention Without Physical Examination of Raw Agricultural Products for Pesticides"
- Import Alert 99-15, "Countrywide Detention Without Physical Examination of Processed Foods for Pesticides"

Growers, manufacturers, and shippers can have their product(s) removed from DWPE under an FDA Import Alert by providing evidence establishing that the conditions that gave rise to the appearance of a violation have been resolved and that there is sufficient evidence for the Agency to have confidence that future entries will be in compliance with the FFDCA. Additionally, a minimum of five consecutive non-violative commercial shipments, as demonstrated by providing FDA with acceptable reports of private laboratory analyses, is required to remove a grower's, manufacturer's, or shipper's product from Import Alert. Removal of a countrywide or geographic area Import Alert would typically require submission to FDA of an effective, detailed approach to correcting the problem, along with acceptable laboratory reports demonstrating compliance of the commodity(ies) in question.

U.S. diets have changed since the 1990's. Most of the U.S. domestic fresh fruit and vegetables are produced during the North American growing season. However, U.S. consumers enjoy having fresh fruits and vegetables year-round as well as a greater variety. To achieve this, the U.S. imports most of these commodities from countries in the equatorial region and Southern Hemisphere during the off growing season of the Northern Hemisphere. With its diverse ethnic and immigrant populations, ethnic foods, tropical fruits and vegetables, and spices, which do not grow in North America, are also being imported year-round. Imported foods also serve to offset supply shortages in domestic foods due to weather and disease problems and to reduce fluctuations in retail prices[4].

Although different climatic and ecological regions of the world often have their own unique pest issues, growers in these regions exporting their products to the U.S. must use only those pesticides with established U.S. tolerances. The diets of Americans are different than those of other countries and the U.S. tolerances reflect these differences.

The USDA conducts consumption surveys (What We Eat in America [WWEIA])[5] periodically and the EPA uses these data in their risk assessment process when registering pesticides. In the U.S., a pesticide must be registered by the manufacturer for use on each specified crop.

Some of the factors considered by FDA in planning the types and origin of commodities to sample include the following:

- analysis of past problem areas
- commodity/pesticide findings from state, USDA, and FDA monitoring
- available foreign pesticide usage data and regional intelligence on pesticide use dietary significance of the food
- volume and product value of individual commodities of domestic food produced and entered into interstate commerce and of imported food offered for entry into the U.S.
- the origin of imported food
- chemical characteristics and toxicity of the pesticide(s) used

Analytical Methods and Pesticide Coverage

To analyze the large numbers of samples whose pesticide treatment history is usually unknown, FDA uses analytical methods capable of simultaneously determining multiple pesticide residues. These multi-residue methods (MRMs) can determine the majority of the approximately 400 pesticides with EPA tolerances, and many others that have no tolerances. They are also able to detect many metabolites, impurities, and alteration products of pesticides[6].

Selective or single residue methods (SRMs) are also used to determine targeted pesticide residues in foods; an SRM determines one pesticide or a small number of selected pesticides and/or chemically related residues. SRMs are more resource intensive per residue and therefore employed more judiciously. A suspicion of a violation or a need to acquire residue data in select commodities will usually trigger use of these methods.

The lower limit of residue measurement in FDA's determination of a specific pesticide is usually well below tolerance levels. Tolerance levels generally range from 0.1 to 50 parts per million (ppm). Residues present at 0.01 ppm and above are usually measurable; however, for individual pesticides, this limit may range from 0.005 to 1 ppm. Trace levels of pesticide residues are also reported. The term "trace" is used to indicate residues that are detected and positively identified at levels greater than, or equal to, the limit of detection (LOD) and below the residue's limit of quantitation (LOQ) for the method employed.

FDA conducts ongoing research to update its pesticide monitoring program. This research includes testing the behavior of new or previously untested pesticides through existing analytical methods, as well as developing new methods to improve efficiencies and detection capabilities. Newer extraction procedures and more sensitive detection techniques have increasingly replaced older methods, allowing for a greater level of pesticide coverage and lower detection limits.

FDA-State Cooperation

FDA field offices interact with their counterparts in many states to enhance the effectiveness of the Agency's pesticide monitoring program. Memoranda of Understanding (MOU) and Partnership Agreements have been established between FDA and many state agencies. These agreements provide for more efficient residue monitoring by both parties by coordinating efforts, broadening coverage, and eliminating duplication of effort. These agreements are specific to each state and take into account available resources. The agreements stipulate how FDA and the state will jointly plan work for collecting and analyzing samples, sharing data, and enforcing compliance follow-up responsibilities for individual commodities of imported and domestic products.

Animal Foods

In addition to monitoring foods for human consumption, FDA also samples and analyzes domestic and imported animal foods for pesticide residues. FDA's Center for Veterinary Medicine (CVM) directs this portion of the Agency's monitoring via its Feed Contaminants Compliance Program. Although animal foods containing violative pesticide residues may present a potential hazard to a number of different categories of animals (e.g., laboratory animals, pets, wildlife), CVM's monitoring focuses on foods for livestock and poultry animals that ultimately become or produce foods for human consumption.

International Activities

FDA is subject to the obligations placed on countries by the World Trade Organization (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement). Pesticide residue tolerances and monitoring activities are included as sanitary measures under the SPS Agreement. FDA's obligations under this agreement include the requirement that standards are based on an assessment, as appropriate to the circumstances, of the risk to human and animal life or health, and on international standards except when a more stringent standard can be scientifically supported. The standards must also be applied equally to domestic and imported products unless there is scientifically based justification for doing otherwise.

Similarly, FDA is subject to obligations arising from several free trade agreements, the most notable of which is the North American Free Trade Agreement (NAFTA). These bilateral or multilateral free trade agreements contain provisions on sanitary measures that are consistent with the provisions of the SPS Agreement. As with the SPS Agreement, the sanitary provisions of these agreements include provisions relating to pesticide residues.

FDA pesticide residue monitoring activities, for domestic and imported products, are a part of the Agency's overall food safety programs and are in keeping with these international obligations. Additionally, arrangements FDA makes with other countries with respect to food safety programs, and the activities that FDA carries out internationally with respect to food safety, can also affect how some of our monitoring is conducted.

FDA maintains a number of arrangements with counterpart agencies in foreign

governments. Such arrangements include MOUs, Confidentiality Agreements, or other formal communications. These arrangements most often contain information-sharing provisions that include the ability to share analytical findings about pesticide residues. Several of the MOUs have specific provisions relating to pesticide residue information sharing or cooperative efforts relating to pesticide residues.

FDA participates regularly in meetings with food safety regulatory agencies of foreign governments, in a variety of settings including bilateral and multilateral fora, and in formal and informal technical and policy meetings. FDA carries out bilateral discussions on food safety with our regulatory partners from around the world; pesticide control programs and pesticide residue issues can be subjects for discussion at these meetings. Multilateral fora in which FDA participates include the Food Safety Cooperation Forum (FSCF) of the Asia Pacific Economic Cooperation (APEC), which promotes regulatory cooperation in food safety including pesticide Maximum Residue Limits (MRLs).

FDA participates in the work of international standards-setting organizations, including that of the Codex Alimentarius Commission (Codex). Within Codex, FDA is an active participant in the work of the Codex Committee on Pesticide Residues. In addition, FDA supports the Joint Institute for Food Safety and Applied Nutrition (JIFSAN), which implements several training programs on pesticide risk assessment and the use of pesticide residue analytical methods.

Focused Sampling

FDA's pesticide monitoring program frequently includes what this report describes as "focused sampling." This approach is primarily regulatory in nature, with the necessary protocols followed to ensure enforcement action can be pursued if a violation is detected. Focused sampling is generally used to follow-up on suspected problem areas or to acquire residue data on select commodities not usually covered during regulatory monitoring. Focused sampling is carried out by short-term field assignments that require collection of specific commodities to be analyzed for pesticide residues using routine MRMs, or targeted residues of interest using SRMs.

Focused sampling differs from what was previously described in FDA's pesticide monitoring program as incidence and level monitoring. Incidence and level monitoring to obtain pesticide residue data generally consisted of non-regulatory analyses of selected samples of commodities of interest. Incidence and level monitoring typically required a follow-up collection and analysis of a regulatory sample to confirm a violation before an FDA enforcement action could ensue. However, due to resource constraints, incidence and level monitoring as done in the past by FDA has been replaced by focused sampling, with the exception noted below for samples collected as part of FDA's TDS program.

FDA Total Diet Study

The Total Diet Study (TDS), conducted by FDA's Center for Food Safety and Applied Nutrition, is distinct from FDA's regulatory monitoring. The TDS program is not regulatory in nature; it monitors incidence and level.

Regulatory monitoring determines pesticide residues in raw commodities, but the TDS monitors foods prepared table-ready for consumption[5]. The TDS food samples are washed, peeled, and/or cooked before analysis, simulating typical consumer handling. In addition to being analyzed for pesticide residues, TDS foods also are selectively analyzed for toxic and nutrient elements, industrial chemicals, and other chemical contaminants.

Another distinction from FDA's pesticide-residue regulatory monitoring is that TDS foods are analyzed at levels 10–100 times lower than the regulatory monitoring program. TDS residue levels as low as 0.1 parts per billion (ppb) routinely are reported.

TDS foods are collected for sampling as "market baskets," with each market basket comprising samples of about 270 different foods that represent the average U.S. consumer's diet, bought from the same retail venues from which consumers buy them. Each year, the market baskets are collected from four different regions of the country, from three different cities in each of those regions. For each region, samples from the three cities are combined to form a single composite prior to analysis.

Additional information about the history and design of the TDS, and analytical results, can be found in several FDA publications [7,8,9,10,11,12,13] and on FDA's TDS website (http://www.fda.gov/Food/FoodScienceResearch/TotalDietStudy/default.htm). The Agency is in the process of updating the website with additional TDS data.

FDA Pesticide Monitoring Program Sampling Design

The goal of FDA's pesticide monitoring program is to carry out selective monitoring to achieve an adequate level of consumer protection. Many of the FDA samples are of the surveillance type; that is, there is no specific prior knowledge or evidence that a particular food shipment contains illegal residues. However, FDA's monitoring is not random or statistically designed; rather emphasis is given to the sampling of commodities and places of origin with a history of violations, and to a lesser extent, larger-sized shipments.

In FY 2013, the import violation rate was 12.6 % and the domestic violation rate was 2.8%. The violation rates for both the domestic and imported samples increased in recent years. This is primarily due to the expanded analytical scope of the pesticide program, i.e., detection of additional new pesticide residues, as a result of implementation of new analytical technologies in 2010 and 2011.

Fiscal Year	Violation Rate (%) Domestic	Violation Rate (%) Import
2009	1.4	4
2010	1.9	4.9
2011	1.6	7.1
2012	2.8	11.1
2013	2.8	12.6

Sampling levels and bias for particular imported or domestic commodities can vary significantly from year to year (e.g., changing weather patterns, new or re-emergent pests, new invasive pest species, or developed resistance to pesticides). Pesticide use changes due to such factors and some countries historically have more problems than others. Targeted commodities may not be the largest imports by volume from a particular country. A high violation rate for a targeted commodity does not mean that a country's overall violation rate for all commodities is high; rather it is an indicator of the effectiveness of FDA's targeted sampling.

FDA has legal jurisdiction over both imports and domestic foods in interstate commerce. FDA allocates more of its resources towards testing imported samples (6,292 in FY 2013) as opposed to domestic samples (1,905 in FY 2013). Several states have their own monitoring programs for pesticides. As stated previously, FDA collaborates with these states and other federal monitoring programs. These other pesticide monitoring programs have agreements to inform FDA of any violative samples found in domestic commerce.

FDA utilizes this data and can follow up on any violations. This allows leveraging and focusing of FDA's resources to where they are most efficiently and effectively used.

An important complement to FDA's regulatory pesticide monitoring program is its TDS program discussed above. For the regulatory program, pesticide tolerances are enforced through targeted sampling of raw agricultural commodities anticipated to contain residues at violative levels. In the TDS, foods representing the totality of the American diet are prepared as consumers would prepare them, before they are analyzed for pesticides at very low levels. Data from the TDS are used to calculate exposures to the pesticides.

Considering the above and coupled with available Agency resources, FDA has not attempted to develop a monitoring program that would be statistically based. However, it is FDA's opinion that the current sampling levels, coupled with broad-based enforcement strategies for imports, allow FDA to achieve the program's main objective of adequate consumer protection by selective enforcement. As described previously, import enforcement strategies that are available to the Agency are placement on Import Alert with DWPE for future entries of commodity/grower combinations that are found in violation of U.S. pesticide tolerances (i.e., residue levels exceeding the established tolerance for a specific residue/item combination, or residues found at a level of regulatory significance in a food for which no tolerance has been established), and country-wide Import Alert and DWPE of particular commodities if the violations are numerous and from multiple growers

within any given country. Once a problem is identified, FDA can achieve broad enforcement by employing these strategies and detaining suspect imported foods at U.S. entry points. This procedure places the burden of demonstrating product compliance with U.S. residue tolerances on the importer before the entry can be released into domestic commerce.

Identification of Imports (Products or Countries) Requiring Special Attention or Additional Studies

Addressing products and countries that warrant special attention is best carried out by providing specific guidance to the Agency field offices and laboratories to conduct increased sampling, both surveillance and focused, by means of field assignments under FDA's "Pesticides and Industrial Chemicals in Domestic and Imported Foods Compliance Program." FDA's sampling strategy of focusing on products that have a history of recurring violations will continue to be applied to future program coverage.

Though specifics are provided in this report regarding import commodities and countries of origin that, based on FY 2013 data, may warrant special attention, FDA's sampling guidance provided to its field districts is typically based on multi-year data. FDA also utilizes available foreign pesticide usage data and data from the USDA's PDP, a statistically representative survey of pesticides in the U.S. diet, to develop sampling guidance. However, meaningful violative episodes that do occur are addressed in real time as much as possible through use of the Import Alert system or enhanced sampling.

When evaluating FDA's import pesticide residue data by product or by country, several factors should be considered:

- The import violation rate has typically been three to four times that of domestic foods. Therefore, it is expected that many imported food products in this report have a violation rate exceeding that of domestic products, and that many foreign countries will have a violation rate exceeding that of the U.S.

- The data analysis by commodity in this report was compiled according to FDA product codes (i.e., distinct commodities). For FY 2013, 810 different import food commodities and 212 different domestic food commodities were tested.

- FDA's pesticide monitoring program should not be viewed as random or statistical, rather it is focused towards products and countries of origin that have a history of violations or are suspected of violations based on available intelligence.

Review by Commodity

Considering the above factors, the following criteria were applied to the FY 2013 data to select import commodities that may warrant special attention (these are the same criteria applied since FY 2008):

- Commodities with at least 20 samples analyzed OR with a minimum of 3 violations

- AND a violation rate of 10 % or higher

Violation rate does not always equate to risk. The majority of the violations are no-tolerance violations and many of these are at low levels (<0.1 ppm). Violations of a commodity exceeding a tolerance are counted the same as a low level no-tolerance violation in Table B. It may be the case that a problem commodity was targeted from a particular country and that all the other commodities were compliant or not tested. These violation rate-country combinations must be viewed in the proper context.

Table A lists the import commodities for FY 2013 that meet the criteria. The commodities are sorted alphabetically and include the total number of samples analyzed and violation rate per commodity as categorized per FDA's product codes.

Table A. Import Commodities That Warrant Special Attention Based on FY 2013 Sampling Results

Commodity†	Samples Analyzed	Violation Rate (%)
Basil, sweet, whole spice*	25	72
Blackberries*	28	17.9
Capsicums, cayenne chili, hot peppers, whole/ground/cracked*	53	56.6
Cherry juice	5	60
Coriandrum*	46	30.4
Coriander, spice, whole/ground/cracked	10	70
Dates, dried/paste	13	23.1
Echinacea	8	50
Ginkgo biloba	14	50
Ginseng*	25	76
Guava, dried/paste	5	60
Husk Tomato	67	10.4
Long beans	13	46.2
Mango	69	10.1
Mushrooms*	48	18.8
Okra	16	37.5
Olive oil, crude	129	10.9
Papaya*	55	21.8
Paprika, spice, whole/ground/cracked*	22	63.6
Peach	22	13.6
Peas	32	12.5

Commodity†	Samples Analyzed	Violation Rate (%)
Pepper, hot	323	14.2
Pepper, hot, dried/paste	66	21.2
Pepper, sweet, dried/paste	8	50
Potato	26	11.5
Prickle Pear*	24	33.3
Prickle Pear Cactus	13	23.1
Psyllium	8	37.5
Raisins*	26	11.5
Raspberries*	49	14.3
Rice, Basmati, processed, packaged*	165	49.7
Rice, cultivated, whole grain*	16	43.8
Rice, enriched, processed, packaged	8	50
Rice, Jasmine, processed, packaged	46	10.9
Rice, processed	31	32.3
Rice*, white/polished, processed*	62	24.2
Serrano Pepper	70	20
Shallot	6	50
Snow Peas*	25	36
Spinach. raw/dried/paste*	52	21.2
String beans (green/snap/pole)	36	19.4
Sugar Snap Peas	36	36.1
Taro*	23	39.1
Tea, Chamomile	4	75
Tea, Oolong*	3	100

†Data listed for the commodities in this table are based upon specific product definitions, and may not be directly comparable to product summary subcategories listed in Appendix B.

*Commodity was on the FY 2012 table of import commodities warranting special attention.

Review by Country of Origin

Table B lists countries of origin with a minimum of 50 samples analyzed and a 7 % or greater violation rate for FY 2013.

Table B. Countries of Origin That Warrant Special Attention Based on FY 2013 Sampling Results

Country	Samples Analyzed	Violation Rate (%)
India	477	32.9
Guatemala	131	24.4
Germany	54	22.2
Pakistan	76	21.1
Costa Rica	75	20
Vietnam	94	19.1
Peru	149	18.8
China	687	15.1
Turkey	85	12.9
Ecuador	71	11.3
Mexico	2,361	9.2
Dominican Republic	135	8.9
Spain	91	8.8
Italy	226	7.1

Acknowledgments

This report was compiled through the efforts of the following FDA staff: Laurie A. Bates, Camille Brewer, Terry Councell, Nathaniel R. Esaw, Delores A. Flenoury, Mallory Kelly, Standra Purnell, Lauren Robin, Charlotte Liang, Chris Sack and Xuhui Zhao, in the Center for Food Safety and Applied Nutrition; Krisztina Z. Atkinson and Randall Lovell, in the Center for Veterinary Medicine.

The database containing the FY 2013 data from which this report was derived is also available from the FDA web at http://www.fda.gov/Food/FoodborneIllnessContaminants/Pesticides/default.htm. The 1996 through 2011 reports and databases are available on the same website. FDA pesticide monitoring data collected under the regulatory monitoring approach in 1992, 1993, 1994, and 1995 are available on personal computer diskettes and may be purchased from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161; (telephone 1-800-553-6847); or at http://www.ntis.gov. Order numbers are: 1992, PB94-500899; 1993, PB94-501681; 1994, PB95-503132; and 1995, PB96-503156.

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Results and Discussion

Regulatory Monitoring

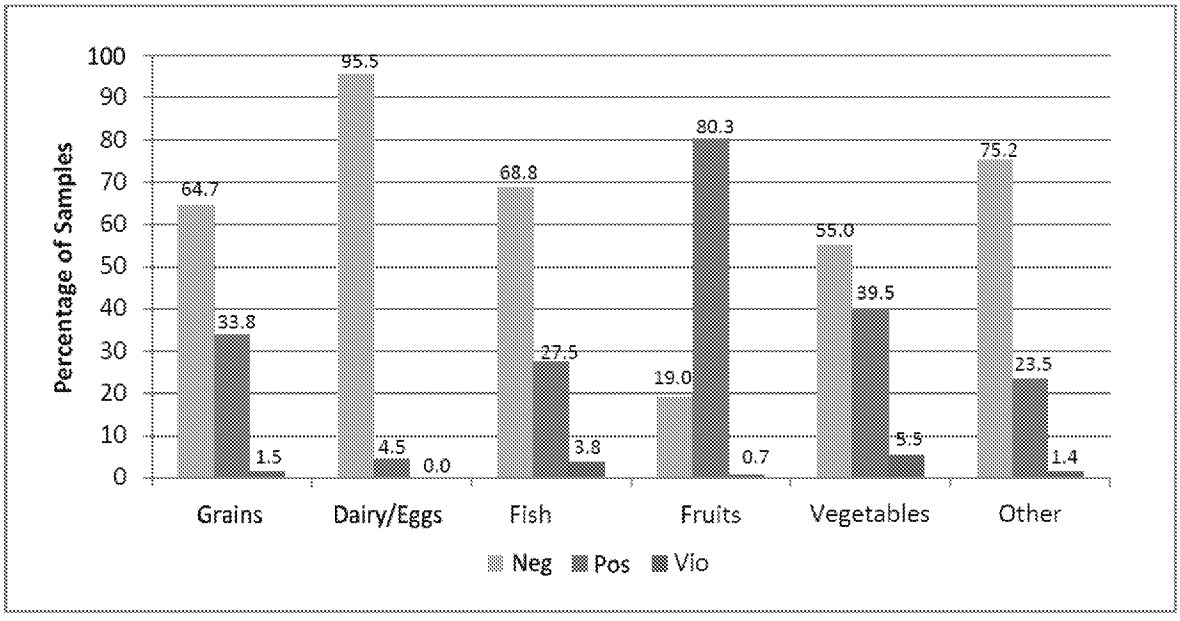
Discussion

Under regulatory monitoring for foods for humans (foods for animals are analyzed separately), 8,197 samples were analyzed. Of these, 1,905 were domestic foods and 6,292 were imported foods. FDA does not test for all the pesticides with a tolerance for every commodity. When reporting the violation rates and pesticides found for both imports and domestic samples, the violation rates and number of pesticides found are only for the pesticides analyzed using FDA's analytical methods listed in Table 3.

Figure 1 shows the percentage of the domestic samples by commodity group with "No Residues Found," "Residues Found; No Violation," and "Violative." A violative residue is defined in this report as a residue found at a level that exceeds either an EPA tolerance published in Title 40 of the Code of Federal Regulations part 180, or an "FDA Action Level"; or, a residue found at a level of regulatory significance for which no tolerance has been established in the sampled food.

Figure 1 - Results of Domestic Samples by Commodity Group

Neg = % Samples with No Residues; Pos = % Samples with Residues – No Violation; Vio = % Violative Samples



In FY 2013, 97.2 % of all domestic foods analyzed by FDA were in compliance, i.e., no residues were found or residues found were below violative levels. The compliance rate for domestic foods for FYs 2009 to 2012 was between 97.2 % and 98.6 %. As in earlier years, fruits and vegetables accounted for the largest proportion of the domestic commodities

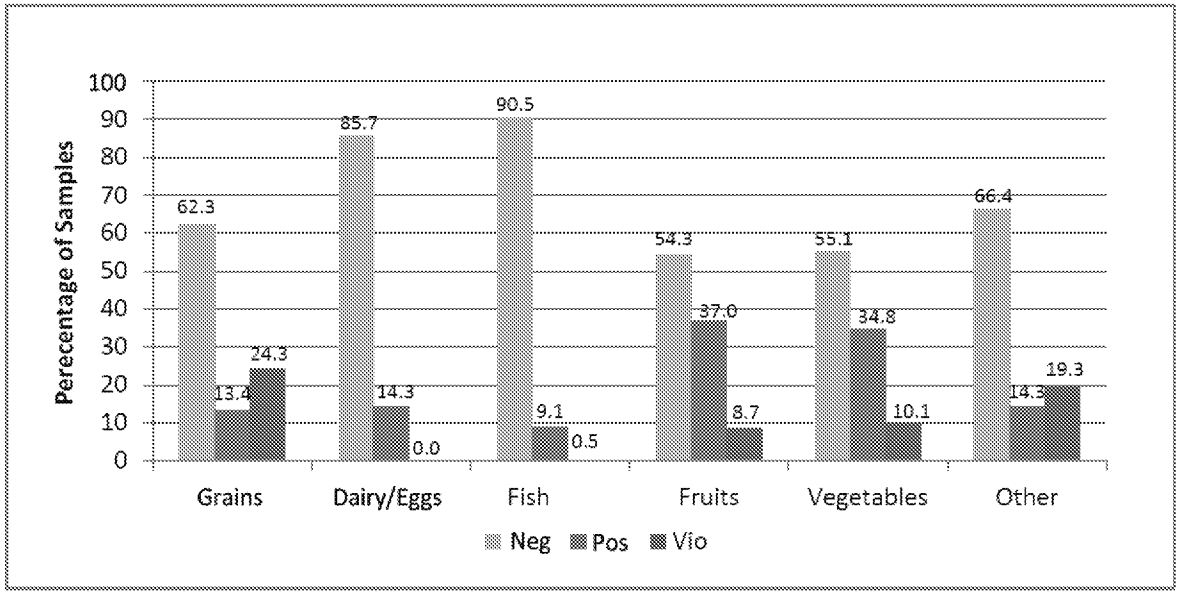
analyzed in FY 2013, comprising 70.7 % of the total number of domestic samples.

Appendix A contains more detailed data on domestic monitoring findings by commodity, including the total number of samples analyzed, the percentage of samples with no residues detected, and the percentage of violative samples including the nature of the violation (over-tolerance vs. no-tolerance). Of the 1,905 domestic samples, 51.3 % had no detectable residues and 2.8 % had violative residues. In the largest commodity groups, fruits and vegetables, 19.0 % and 55.0 % of the samples, respectively, had no residues detected; 0.7 % of the fruit samples and 5.5 % of the vegetable samples contained violative residues (Figure 1). In the grains and grain products group, 64.7 % of the samples had no residues detected, and 1.5 % had violative residues. In the fish/shellfish/other aquatic products group, 68.8 % had no detectable residues and 3.8 % of samples had violative residues. In the milk/dairy products/eggs group, 95.5 % of the samples analyzed had no detectable residues and none had violative residues. In the "Other" foods group that covers nuts, seeds, snack foods, and spices among other foods, 75.2 % of the samples analyzed had no detectable residues, and 1.4 % had violative residues.

Findings by commodity group for the 6,292 import samples are shown in Figure 2. Overall for all imported foods, 87.4 % of the samples analyzed in FY 2013 were in compliance. This compares with a compliance rate for imported foods for FYs 1996 through 2012 of 89–98 %. Fruits and vegetables accounted for 67.7 % of import samples.

Figure 2 - Results of Import Samples by Commodity Group

Neg = % Samples with No Residues; Pos = % Samples with Residues – No Violation; Vio = % Violative Samples



Appendix B contains detailed data on import samples. Of the 6,292 import samples analyzed, 59.1 % had no residues detected, while 12.6 % had violative residues. No residues were detected in 54.3 % of imported fruit samples and 8.7 % of samples had violative residues. Of the vegetable samples, 55.1 % of samples had no residues detected and 10.1 % of samples had violative residues. No residues were found in 85.7 % of samples of the imported milk/dairy products/eggs group and none had violative residues. No residues were found in 90.5 % of the imported fish/shellfish group and 0.5 % had violative residues. In the imported grains and grain products group, 62.3 % had no detectable residues, and 24.3 % contained violative residues. In the "Other" foods group consisting largely of nuts, seeds, oils, honey, candy, spices, multiple food products, and dietary supplements, 66.4 % of the samples analyzed had no residues detected, while 19.3% of the samples (mostly dietary supplements and spices) had violative residues.

Pesticide monitoring data collected under FDA's regulatory monitoring approach in FY 2013 are available to the public as a computer database. This database summarizes FDA FY 2013 regulatory monitoring coverage and findings by country/commodity/pesticide combination. The database also includes monitoring data by individual samples from which the summary information was compiled. Information on how to obtain this database as well as those for FYs 2008–2012 is provided in the acknowledgements section of this report.

Geographic Coverage

Domestic: A total of 1,905 domestic samples were collected in FY 2013 from 46 states and Puerto Rico. Table 1 lists the number of domestic samples from each state and territory, in descending order.

Table 1. Domestic Samples Collected and Analyzed per State/Territory

State/Territory	Samples (#)	State/Territory	Samples (#)
Washington	272	North Dakota	18
California	152	Maine	17
Minnesota	152	Tennessee	15
New York	150	Wyoming	15
Illinois	91	Kentucky	13
Texas	89	Mississippi	13
Wisconsin	88	Georgia	12
Michigan	81	New Hampshire	7
Florida	79	New Mexico	7
Oregon	59	Rhode Island	7
Colorado	55	Utah	6
Idaho	54	Delaware	5
Missouri	50	Nebraska	5
Ohio	49	South Carolina	5
Louisiana	48	South Dakota	5

State/Territory	Samples (#)	State/Territory	Samples (#)
Virginia	47	Alaska	4
Maryland	34	Connecticut	4
New Jersey	32	Vermont	3
Kansas	30	North Carolina	2
Pennsylvania	30	Alabama	1
Massachusetts	27	Oklahoma	1
Indiana	23	Puerto Rico	1
Iowa	23	West Virginia	1
Montana	23		

No domestic samples were collected from the District of Columbia or the states of Arizona, Arkansas, Hawaii, and Nevada.

Imports: A total of 6,292 samples representing food shipments from 97 countries were collected in FY 2013. Table 2 lists the number of samples and names of countries from which ten or more samples were collected. Table 2a lists the countries of origin that had fewer than ten samples collected in FY 2013.

Table 2. Import Samples Collected and Analyzed per Country of Origin for Countries with Ten or More Samples Collected

Country	Samples (#)	Country	Samples (#)
Mexico	2361	Lebanon	40
China	687	Netherlands	35
India	477	Brazil	33
Canada	311	Colombia	32
Italy	226	Poland	30
Chile	193	United Kingdom	23
Peru	149	Belgium	19
Thailand	140	Philippines	19
Dominican	135	Israel	16
Guatemala	131	Japan	16
Vietnam	94	United Arab	16
Spain	91	Honduras	15
Turkey	85	Jamaica	15
United States	81	Australia	14
Pakistan	76	Hong Kong SAR	13
Costa Rica	75	South Africa	13
Ecuador	71	Indonesia	12
Argentina	61	Morocco	12
Germany	54	Tunisia	12
South Korea	48	Afghanistan	11
Egypt	46	Bangladesh	11

Country	Samples (#)	Country	Samples (#)
France	42	Bolivia	11
Greece	41	Nicaragua	10
Taiwan	41		

Table 2a. Countries from Which Fewer Than Ten Samples Were Collected and Analyzed

Algeria	Ireland	Senegal
Austria	Ivory Coast	Serbia
Azerbaijan	Jordan	Sri Lanka
Barbados	Kazakhstan	St. Vincent & The Grenadines
Belize	Kenya	Sweden
Bulgaria	Latvia	Switzerland
Cambodia	Lithuania	Syrian Arab Republic
Croatia	Madagascar	Timor Leste
Cuba	Malaysia	Togo
Cyprus	New Zealand	Tonga
Djibouti	Nigeria	Trinidad & Tobago
El Salvador	Norway	Uganda
Ethiopia	Papua New Guinea	Ukraine
Fiji	Portugal	Uruguay
French Polynesia	Russia	Vanuatu
Georgia	Rwanda	Yemen
Ghana	Saudi Arabia	

Domestic/Import Violation Rate Comparison

In FY 2013, 1,905 domestic and 6,292 import samples were collected and analyzed. Pesticide residues were detected in 48.7 % of the domestic samples and in 40.9 % of the import samples. Violative residues were found in 2.8 % of the domestic samples and 12.6% of the import samples. Among grains and grain products, the violation rate was 24.3 % for imports; only 2 of the domestic samples contained violative residues. No violations were found in the milk/dairy products/eggs group for either imports or domestic samples. The fish/shellfish/other aquatic products group had 3 violative domestic samples and only 1 violative imported sample. In fruit samples, the violation rate was 0.7 % for domestic samples and 8.7 % for imports. For vegetables, 5.5 % of domestic samples and 10.1 % of import samples contained violative residues. In the category "Other" (mostly nuts, seeds, oils, honey, candy, spices, multiple food products, and botanical dietary supplements), the violation rate was 1.4 % for domestic samples and 19.3 % for import samples. Botanicals accounted for most of the samples with violative residues for the import "Other" foods group.

Of the 54 domestic violative samples, 50 were found to contain pesticide residues that have no published EPA tolerance, i.e. "no-tolerance" violation; and 5 were found to contain pesticide residues that exceeded a tolerance, i.e. "over-tolerance" violation. A single sample had both a no-tolerance violation and an over-tolerance violation.

Of the 791 import violative samples, 779 were found to contain no-tolerance, violative pesticide residues; and 36 were found to contain over-tolerance/action level pesticide residues. Additionally, 24 of the 779 import violative samples that contained no- tolerance, violative residues also had other pesticide residues that exceeded a tolerance.

Pesticide Coverage

Table 3 lists the 424 pesticides that can be detected (Detectable) by the methods used in FY 2013; each of the 219 pesticides that were actually detected (Found) is indicated by an asterisk (*) and 2 pesticides not previously detected (New) are flagged by †.

Table 3. Pesticides Detectable, Found, and New by Methods Used in FY 2013

2,6-DIPN*	3,4-dichloroaniline	Abamectin*
Acephate*	Acetamiprid*	Acetochlor
Acibenzolar-S-	Acrinathrin	Alachlor
Alanycarb	Aldicarb*	Aldrin
Allethrin	Alpha cypermethrin	Ametryn*
Amicarbazone	Aminocarb	Amitraz
Aspon	Atrazine*	Azinphos ethyl
Azinphos-methyl*	Azoxystrobin*	Benalaxyl*
Bendiocarb*	Benfluralin	Benfuracarb
Bentazon	Benzoximate	BHC*
Bifenazate*	Bifenthrin*	Biphenyl*
Bitertanol*	Boscalid*	Bromophos
Bromophos-ethyl	Bromopropylate	Bromuconazole
Bufencarb	Bupirimate*	Buprofezin*
Butafenacil	Butocarboxim	Butoxycarboxim
Butralin	Butylate	Cadusafos
Captan*	Carbaryl*	Carbendazim*
Carbetamide	Carbofuran*	Carbophenothion
Carbosulfan	Carboxin	Carfentrazone ethyl
Chlorantraniliprole*	Chlordane*	Chlordimeform*
Chlorethoxyfos	Chlorfenapyr*	Chlorfenvinphos
Chlorfluazuron*	Chlormephos	Chlorobenzilate
Chloroneb	Chlorothalonil*	Chlorotoluron
Chloroxuron	Chlorpropham*	Chlorpyrifos methyl*
Chlorpyrifos*	Chlorthiophos	Clethodim
Clofentezine*	Clomazone	Clothianidin*
Coumaphos*	Crotoxyphos	Cumyluron
Cyanazine	Cyanofenphos	Cyanophos
Cyazofamid*	Cycloate*	Cycluron
Cyflufenamid*	Cyfluthrin*	Cymoxanil*
Cypermethrin*	Cyprazine	Cyproconazole*
Cyprodinil*	Cyromazine*	Daimuron
DCPA*	DDT*	DEF
Deltamethrin*	Demeton	Desmedipham*
Desmetryn	Diafenthiuron *	Dialifor
Diallate	Diazinon*	Dichlobenil*

Dichlofenthion	Dichlofluanid	Dichlorvos*
Diclobutrazol	Dicloran*	Dicofol*
Dicrotophos	Dieldrin*	Diethofencarb*
Difenoconazole*	Diflubenzuron*	Dimethachlor
Dimethenamid	Dimethoate*	Dimethomorph*
Dimoxystrobin	Diniconazole*	Dinitramine
Dinobuton	Dinotefuran*	Dioxacarb
Dioxathion	Diphenamid*	Diphenylamine*
Disulfoton	Diuron*	DNOC
Doramectin*	Edifenphos	Emamectin benzoate*
Endosulfan*	Endrin	EPN*
Epoxiconazole*	Eprinomectin	EPTC*
Esfenvalerate*	Esprocarb	Etaconazole
Ethaboxam*	Ethalfluralin	Ethidimuron
Ethiofencarb	Ethiolate	Ethion*
Ethiprole	Ethirimol*	Ethofumesate
Ethoprop*	Ethoxyquin*	Etobenzanid
Etofenprox*	Etoxazole*	Etridiazole
Etrimfos	Famoxadone*	Famphur
Fenamidone*	Fenamiphos	Fenarimol*
Fenazaquin*	Fenbuconazole*	Fenbutatin oxide†
Fenfuram	Fenhexamid*	Fenitrothion*
Fenobucarb(BPMC)*	Fenoxycarb*	Fenpropathrin*
Fenpropimorph	Fenpyroximate, e-*	Fensulfothion
Fenthion*	Fenuron	Fenvalerate*
Fipronil*	Flonicamid*	Fluazinam
Flubendiamide*	Fluchloralin	Flucythrinate
Fludioxonil*	Flufenacet	Flufenoxuron*
Fluometuron	Fluopicolide*	Fluoxastrobin*
Fluquinconazole*	Fluridone	Flusilazole*
Fluthiacet-methyl	Flutolanil*	Flutriafol*
Fluvalinate	Folpet*	Fonofos
Forchlorfenuron*	Formetanate*	Formothion
Fosthiazate	Fuberidazole	Furalaxyl
Furathiocarb	Gardona	Halofenozide
Heptachlor*	Heptenophos	Hexachlorobenzene*
Hexaconazole*	Hexaflumuron	Hexazinone*
Hexythiazox*	Hydramethylnon	IBP*
Imazalil*	Imibenconazole	Imidacloprid*
Indoxacarb*	Ipconazole	Iprodione*
Iprovalicarb*	Isazofos	Isocarbamid
Isocarbophos*	Isofenphos	Isoprocarb*
Isopropalin	Isoprothiolane*	Isoproturon
Isoxaflutole	Ivermectin	Kresoxim-methyl*
Lactofen	Lambda-cyhalothrin*	Lenacil
Leptophos	Lindane*	Linuron*
Lufenuron*	Malathion*	Mandipropamid*

Mecarbam	Mefenacet	Mepanipyrim*
Mepronil*	Mesotrione	Metaflumizone*
Metalaxyl*	Metaldehyde	Metconazole*
Methabenzthiazuron	Methamidophos*	Methidathion*
Methiocarb*	Methomyl*	Methoprene*
Methoprotryne	Methoxychlor	Methoxyfenozide*
Metobromuron	Metolachlor	Metolcarb
Metrafenone *	Metribuzin*	Mevinphos
Mexacarbate	MGK 264*	Mirex
Molinate	Monocrotophos*	Moxidectin
Myclobutanil*	Napropamide*	Neburon
Nicotine*	Nitenpyram	Nitrofen
Nitrothal-isopropyl	Norflurazon	Novaluron*
Nuarimol*	Octhilinone	Octyldiphenyl PO4
Omethoate*	Oxadiazolin-5-one, 2- carboxy-ipr-4-(4cl)-5-iprphenyl- 1,3,4-†	Oxadiazon*
Oxadixyl*	Oxamyl*	Oxydemeton-methyl
Oxyfluorfen*	Paclobutrazol*	Parathion methyl*
Parathion*	Pebulate	Penconazole*
Pencycuron	Pendimethalin*	Permethrin*
Phenmedipham	Phenothrin	Phenthoate
Phenylphenol, o-*	Phorate*	Phosalone*
Phosmet*	Phosphamidon	Phoxim*
Picoxystrobin*	Piperonyl butoxide*	Piperophos
Pirimicarb*	Pirimiphos ethyl*	Pirimiphos methyl*
Prallethrin	Prochloraz*	Procymidone*
Profenofos*	Profluralin	Promecarb*
Prometon*	Prometryn*	Pronamide
Propachlor	Propamocarb*	Propanil
Propargite*	Propazine	Propetamphos
Propham	Propiconazole*	Propoxur*
Prothiofos*	Prothoate	Pymetrozine*
Pyracarbolid*	Pyraclostrobin*	Pyrazophos
Pyridaben*	Pyridaphenthion	Pyrifenox
Pyrimethanil*	Pyriproxyfen*	Quinalphos*
Quinoxyfen*	Quintozene*	Resmethrin
Ronnel	Rotenone*	Salithion
Schradan	Sebuthylazine	Secbumeton
Siduron	Simazine	Simetryne
Spinetoram*	Spinosad*	Spirodiclofen*
Spiromesifen*	Spirotetramat*	Spiroxamine*
Sulfentrazone	Sulfotepp	Sulprofos
Tebuconazole*	Tebufenozide*	Tebufenpyrad*
Tebupirimfos	Tebutam	Tebuthiuron
Tecnazene*	Teflubenzuron	Tefluthrin
Temephos	Terbufos	Terbumeton
Terbuthylazine*	Terbutryn	Tetraconazole*

Tetradifon*	Tetramethrin*	Thiabendazole*
Thiacloprid*	Thiamethoxam*	Thidiazuron
Thiobencarb	Thiofanox	Thiometon
Thionazin	Thiophanate-methyl*	Tolclofos methyl*
Tolylfluanid	Triadimefon*	Triadimenol*
Tri-allate	Triazophos*	Tributoxy PO4
Trichlorfon*	Triclosan	Tricyclazole*
Trifloxystrobin*	Triflumizole*	Triflumuron
Trifluralin*	Triflusulfuron methyl ester	Trimethacarb
Triphenyl PO4*	Tris(1,3-dichloro-2-propyl) PO4	Tris(beta-chloroethyl) PO4
Tris(chloropropyl)	Triticonazole	Uniconazole
Vamidothion	Vernolate	Vinclozolin
Zoxamide*		

Animal Foods

In FY 2013, a total of 420 animal food samples were analyzed for pesticides by the FDA. The breakdown of samples by type of animal food and number of positive and violative samples is shown in Table 4.

Of the 420 animal food samples, 254 samples were domestic and 166 samples were imports. Of the 254 domestic surveillance samples, 118 (46.5%) contained no detectable residues, and 136 (53.5%) contained one or more residues, of which 3 (1.2%) were violative. Of the 166 import samples, 99 (59.6%) contained no detectable residues, and 67 (40.4%) contained one or more residues, of which 8 (4.8%) were violative.

During FY 2013, three domestic samples were found to contain one or more violative residues. Two shipments of wheat from Missouri had residues exceeding tolerances. In one wheat sample, 21.5 ppm malathion was well above the 8 ppm limit; and in the other 2.1 ppm cyfluthrin exceeded the 0.15 ppm tolerance. Cottonseed meal from Texas had 0.399 ppm permethrin; there is no tolerance established on this commodity.

Eight import samples were found to contain one or more violative residues. Two sweet potato samples (flour and granules) from China were found to contain 0.098 ppm and 0.043 carbendazim (a degradant of thiophanate methyl), respectively. No tolerance is established for thiophanate methyl in sweet potatoes and none are listed for carbendazim in any crop. Three samples of soluble wheat protein imported from France and a sample of wheat gluten from Belgium contained pirimiphos-methyl at 0.700, 0.442, 0.660, and 0.101 ppm, respectively. Because no tolerance for this pesticide is listed in wheat grain, the samples are violative. However, the three wheat protein samples from France were suspected to contain aspirated grain fractions, which have a 20 ppm tolerance for pirimiphos methyl, therefore they were not classified as violative at the time of analysis. Ukrainian millet was found to contain 0.011 ppm malathion; malathion has tolerances for a variety of grains, but not millet. A sample of canola meal contained 0.141 ppm fludioxonil, which is above the 0.01 ppm tolerance.

Table 4. Summary of Animal Foods Analyzed for Pesticides

Commodity Type	Samples Analyzed #	Without Residues # (%)	Violative Samples # (%)
Totals – All Samples	**420**	**217 (51.7)**	**11 (2.6)**
Sample Origin			
Domestic	254	118 (46.5)	3 (1.2)
Import	166	99 (59.6)	8 (4.8)
Commodity Type			
Whole and Ground Grains/Seeds	178	135 (75.8)	3 (1.7)
Mixed Livestock Food Rations	109	32 (29.4)	0 (0)
Medicated Livestock Food Rations	17	3 (17.7)	0 (0)
Plant Byproducts	50	30 (60.0)	7 (14.0)
Hay and Silage	8	4 (50.0)	0 (0)
Animal Byproducts	7	2 (28.6)	0 (0)
Pet Food/Treats	44	5 (11.4)	1 (2.3)
Other Animal Food Ingredients	7	6 (85.7)	0 (0)

In FY 2013, a total of 59 different pesticides were found in animal foods. Table 5 lists the 34 pesticides found in at least two samples; 25 other pesticides were found in only one sample. Of the 420 samples analyzed, 203 were found to contain at least one pesticide (includes both violative and non-violative samples); 136 of these were domestic and 67 were imported. A total of 403 residues were detected in all samples, 285 in domestic and 118 in imports. For all samples, ethoxyquin and malathion were the most frequently found pesticides and together accounted for 53.8% of all residues detected (Table 5).

Piperonyl butoxide was the third most commonly detected residue contributing 6.7% to the total.

Table 5. Pesticides Most Commonly Reported in Samples of Foods for Animals*

Pesticide	Samples # (%)†	Minimum††	Maximum††	Median††	Mean††
Ethoxyquin	117 (29.0)	0.006	145	0.384	8.09
Malathion	100 (24.8)	0.006	21.5	0.024	0.460
Piperonyl butoxide	27 (6.7)	0.007	5.00	0.047	0.460
Chlorpyrifos methyl	13 (3.2)	0.007	3.01	0.024	0.340
Tebuconazole	11 (2.7)	0.012	0.062	0.021	0.020
Pirimiphos methyl	9 (2.2)	0.021	0.700	0.128	0.270
Azoxystrobin	9 (2.2)	0.005	0.128	0.021	0.030
Chlorpyrifos	7 (1.7)	0.008	0.011	0.011	0.010
Phenylphenol, o-	6 (1.5)	0.005	0.199	0.093	0.070

Pesticide	Samples # (%)†	Minimum††	Maximum††	Median††	Mean††
Imidacloprid	6 (1.5)	0.010	0.023	0.013	0.010
Lambda-cyhalothrin	5 (1.2)	0.008	0.021	0.014	0.010
Boscalid	5(1.2)	0.010	0.013	0.010	0.010
Propiconazole	4 (1.0)	0.014	0.100	0.024	0.040
Cyfluthrin	4 (1.0)	0.006	2.10	0.061	0.540
DEF	4 (1.0)	0.007	0.213	0.024	0.070
Chlorpropham	4 (1.0)	0.027	4.29	0.364	1.26
Methoprene	4 (1.0)	0.064	1.99	0.116	0.570
Carbaryl	4 (1.0)	0.006	0.250	0.007	0.070
Diphenylamine	4 (1.0)	0.006	0.010	0.008	0.010
Pymetrozine	4 (1.0)	0.013	0.013	0.010	0.010
Deltamethrin	3 (0.7)	0.009	0.300	0.096	0.140
Bifenthrin	3 (0.7)	0.031	0.057	0.032	0.040
DDE, p,p'-	3 (0.7)	0.006	0.014	0.011	0.010
Dichlorvos	2 (0.5)	0.011	0.404	0.210	0.210
MGK 264	2 (0.5)	0.025	0.037	0.030	0.030
Diflubenzuron	2 (0.5)	0.025	0.039	0.030	0.030
Spinosyn A	2 (0.5)	0.047	0.258	0.150	0.150
Thiabendazole	2 (0.5)	0.011	0.042	0.030	0.030
Fludioxonil	2 (0.5)	0.100	0.141	0.120	0.120
Metconazole	2 (0.5)	0.01	0.013	0.010	0.010
Carbendazim	2 (0.5)	0.043	0.098	0.070	0.070
Tricyclazole	2 (0.5)	0.044	0.044	0.044	0.040
Biphenyl	2 (0.5)				
Thiamethoxam	2 (0.5)				

*59 different pesticides were found in foods for animals. The 34 pesticides with frequency of finding in at least 2 samples are listed. 25 additional pesticides were identified in a single sample only and were not presented in this table.

† Number of samples in which residue was found. () denotes percentage of the total 403 residues found in all samples

††Residue levels calculated for samples containing quantifiable residues

Focused Sampling

As previously described, FDA conducts "focused sampling" by means of short-term, regulatory-based field assignments. In FY 2013, FDA issued three pesticide-related field assignments, "Sample Collection and Analysis of Imported Dietary Supplements of Botanical Origin for Pesticides and Toxic Elements", "Collection of Domestic and Domestic Import Tea Samples for Pesticide Residue Analysis," and "European Union Audit Field Assignment."

Dietary supplements

Because of their low consumption, dietary supplements are not normally sampled; however, data indicate the use of dietary supplements is increasing. Therefore, in FY 2013 FDA initiated a third assignment to collect and analyze widely used dietary supplements of botanical origin to provide data on the incidence of pesticides. For the assignment FDA collected 257 samples; summary results are listed in Table 6a. 167 samples are included in the 26 different assigned product categories; an additional 90 miscellaneous and uncategorized herbal/botanical supplement samples were also analyzed. Of the 257 samples analyzed, 64 (24.9%) contained violative residues (all no- tolerance violations). Samples were collected from 29 different countries, including one domestic sample from the USA. The bulk of the samples were imported from China (128) and India (40); of the remaining countries only Canada (15) was the origin of more than ten samples. The violation rates for samples from these three countries were similar, ranging from 20.0% for India to 26.7% for Canada.

Table 6a. Origin and Number of Violative Botanical Samples Collected

Botanical Supplement	Total Samples Collected	Country Origin	Analyzed	Violative
Actaea racemosa	6	Canada	2	0
		China	3	0
		France	1	0
Aesculus hippocastanum L.	1	France	1	0
Allium setivum	4	China	3	0
		Japan	1	0
Andrographis paniculata	5	Canada	2	1
		China	2	0
		India	1	1
Bacopa monnieri L.	7	Australia	1	0
		India	6	4
Bee propolis	2	Canada	1	0
		China	1	0
Bupleurum chinense DC.	4	China	4	0
Coleus forskohlii	4	China	1	0
		India	3	1
Curcuma longa	14	Bangladesh	1	0
		China	4	0
		India	8	0
		Italy	1	0
Dashmoola	5	China	3	0
		India	2	1
Echinacea species	8	Australia	1	1
		Canada	3	1
		China	2	1
		Germany	2	1
Eleutherococcus senticosus	16	Australia	1	0
		China	14	1
		France	1	0

Botanical Supplement	Total Samples Collected	Country Origin	Analyzed	Violative
Equisetum palustre L.	4	Canada	1	0
		China	3	1
Eucommia ulmoides Oliv.	1	China	1	0
Euterpe oleracea Mart.	4	Brazil	2	0
		China	1	1
		Germany	1	0
Ginkgo biloba	15	China	11	6
		France	1	1
		Italy	1	0
		Japan	1	0
		Switzerland	1	0
Hibiscus sabdariffa L.	7	China	1	0
		Egypt	4	1
		Nigeria	1	1
		Senegal	1	0
Matricaria recutita L.	10	China	2	1
		Costa Rica	1	1
		Egypt	3	1
		France	2	1
		Germany	2	1
Mentha species	4	China	3	1
		Egypt	1	1
Ocimum tenuiflorum L.	6	India	6	0
Papaver somniferum	2	India	2	1
Paullinia cupana Kunth.	7	Brazil	6	0
		United States	1	0
Salix species	4	China	4	1
Saposhnikovia divaricata	3	China	2	0
		Mexico	1	0
Schisandra chinensis	10	China	10	4
Valeriana officinalis L.	14	China	3	0
		Colombia	1	0
		Germany	3	2
		India	2	0
		Mexico	1	0
		Pakistan	1	0
		Poland	1	1
		Russia	1	1
		Spain	1	1
Other Herbals and Botanical Supplements	90	Barbados	1	0
		Belgium	1	0
		Brazil	1	0
		Bulgaria	2	0

Botanical Supplement	Total Samples Collected	Country Origin	Analyzed	Violative
		Canada	6	2
		China	50	16
		Costa Rica	1	0
		France	1	1
		Hong Kong SAR	3	0
		India	10	0
		Italy	2	1
		Japan	2	0
		Mexico	3	0
		Peru	4	0
		South Africa	2	2
		Taiwan	1	0

Tea

In FY 2013, FDA analyzed 22 samples of black, green, and white teas collected from retail outlets with the intention of determining incidence levels of pesticide residues in national brands of teas (Table 6b).

Table 6b. Types of Tea Collected

Type of Tea	Number of Samples
Black Tea	9
Green Tea	7
White Tea	1
Mix (Black and Green)	5

The samples were analyzed for over 200 pesticides using a selective residue method. Of the three different pesticides found (listed in Table 6c), only acetamiprid has an EPA tolerance for tea. Imidacloprid is allowed at fairly high levels in a variety of raw agricultural commodities and the single residue of triazophos is below the FDA LOQ of 10 ppb.

Table 6c. Pesticides Found in 22 Collected Tea Samples[1]

Compound	Samples with Residues	Range of detected residues (ppm)
Acetamiprid	3	0.023-0.093
Imidicloprid	2	0.026-0.040
Triazophos	1	0.005

[1]The selective residue method used in this study detects fewer pesticides than the analytical regimen used for routine pesticide monitoring. (Chen et al., 2012, *Journal of Agricultural and Food Chemistry* 60, 9991-9999).

European Union Audit Field Assignment

In 2010, the European Union (EU) conducted an audit of the FDA pesticide program and found differences between the approaches that EU and FDA use to monitor pesticide residues in domestically produced animal derived foods. As a result, FDA issued an assignment to analyze pesticide levels in raw milk, shell eggs, and honey. For the assignment in FY 2013, FDA collected 253 samples; i.e., 8 raw milk samples were collected from dairy farms, 175 egg samples and 70 honey samples were collected from retail outlets. The number of samples collected and residues found for each of the three commodities are listed in Table 6d.

Table 6d. Pesticides Found in Selected Commodities for the European Union Audit Field Assignment

Commodity	# Samples Analyzed	Pesticide	# Samples with residues	Residue Levels (PPM)
Raw Milk	8	None	N/A	N/A
Eggs (in shell)	175	Ethoxyquin	3	0.014 - 0.125
		Piperonyl butoxide	1	Trace
		Pyrimethanil	1	Trace
		Tebufenpyrad	1	Trace
Honey	70	Carbendazim	3	0.013 - 0.016
		Flonicamid	1	Trace
		Imidacloprid	1	Trace
		Piperonyl butoxide	2	0.012 - 0.019

Very few residues were found in the European audit samples; only 13 of the 253 samples analyzed contained a pesticide residue. No residues were found in milk. Only three of the pesticides found were above the trace level, i.e., ethoxyquin in eggs, and carbendazim and piperonyl butoxide in honey.

Ethoxyquin is a food preservative approved for use in animal foods with a food additive tolerance of 0.5 ppm in eggs. Low level residues in honey are likely due to inadvertent contamination introduced by bees as they collect nectar from flowers.

Total Diet Study

More than 350 pesticide residues can be detected by the analytical methods used in FDA's TDS. Residues of 165 individual compounds were found in the foods analyzed in the four market baskets reported for FY 2013 (Market Baskets 12-4, 13-1, 13-2, and 13- 3). The compounds consisted of parent pesticides and related compounds (e.g., isomers, metabolites, degradation products) that are included with the results for the parent pesticide for reporting purposes.

Table 7 lists the most frequently found pesticide residues (i.e., residues found in at least 2% of the samples) in TDS foods, the total number of findings, and the occurrence as a percentage of all items analyzed in the four market baskets analyzed in FY 2013 (1,070 total samples). The 10 most frequently observed pesticide residues are consistent with those reported in FY 2012.

Table 7. Frequency of Occurrence of Pesticide Residues in the Total Diet Study[1]

Pesticide[2]	Findings #	Occurrence %	Range ppm
Boscalid	355	33	0.0001-0.217
DDT	284	27	0.0001-0.012
Piperonyl butoxide	269	25	0.0001-0.218
Azoxystrobin	188	18	0.0001-0.142
Malathion	176	16	0.0001-0.094
Imidacloprid	161	15	0.0005-0.052
Bifenthrin	159	15	0.0001-1.180
Chlorpyrifos	143	13	0.0001-0.048
Acetamiprid	139	13	0.0001-0.035
Thiabendazole	117	11	0.0001-0.306
Methoxyfenozide	110	10	0.0001-0.278
Chlorantraniliprole	107	10	0.0003-0.171
Chlorpyrifos methyl	101	9	0.0001-0.030
Carbendazim	99	9	0.0002-0.055
Metalaxyl	93	9	0.0001-0.072
Pyraclostrobin	86	8	0.0002-0.092
Lambda-cyhalothrin	84	8	0.0002-0.086
Myclobutanil	82	8	0.0001-0.031
Phenylphenol, o-	78	7	0.0002-0.228
Thiamethoxam	78	7	0.0001-0.032
Pyrimethanil	76	7	0.0002-1.030
Chlorpropham	74	7	0.0002-2.420
Difenoconazole	73	7	0.0001-0.005
Tebuconazole	69	6	0.0002-0.413
MGK 264	67	6	0.0001-0.031
Cyprodinil	62	6	0.0001-0.452
Carbaryl	57	5	0.0003-0.061
Permethrin	52	5	0.0007-3.280
Captan	48	4	0.001-0.404
Thiacloprid	46	4	0.0002-0.030
Trifloxystrobin	44	4	0.0001-0.013
Fludioxonil	39	4	0.0003-0.250
Propamocarb	39	4	0.0002-0.244
Imazalil	34	3	0.0005-0.204
Propiconazole	32	3	0.0004-0.149
Metribuzin	31	3	0.0002-0.026
Clothianidin	30	3	0.0007-0.020
Buprofezin	30	3	0.0001-0.033
Clopyralid[3]	30	3	0.0003-0.020
Fluopicolide	29	3	0.0001-0.467

Diphenylamine	27	3	0.0001-0.428
Pirimiphos methyl	27	3	0.0001-0.408
Iprodione	26	2	0.0009-0.879
Quinclorac[3]	26	2	0.0001-0.026
Flubendiamide	25	2	0.0001-0.132
Quinoxyfen	25	2	0.0001-0.013
Bifenazate	25	2	0.0004-0.024
Fenhexamid	22	2	0.0006-0.210
Mandipropamid	21	2	0.0001-0.970
Cyfluthrin	20	2	0.0003-0.702
Fenvalerate	20	2	0.0006-0.039
Imazamox[3]	19	2	0.0001-0.0007
Methamidophos	19	2	0.0007-0.100
Endosulfan	18	2	0.0001-0.036
Dimethoate	18	2	0.0002-0.003
Linuron	18	2	0.0006-0.023
2,4-D[3]	17	2	0.0005-0.009
Pendimethalin	17	2	0.0002-0.002

[1] Based on 4 market baskets consisting of 1,070 total items.

[2] Isomers, metabolites, and related compounds are included with the 'parent' pesticide.

[3] Reflects overall incidence; i.e. based on analysis of all samples, though only 21 selected foods per market basket (84 items total) were analyzed for acid herbicides. (Samples not analyzed are counted as negative for the residues of acid herbicides.)

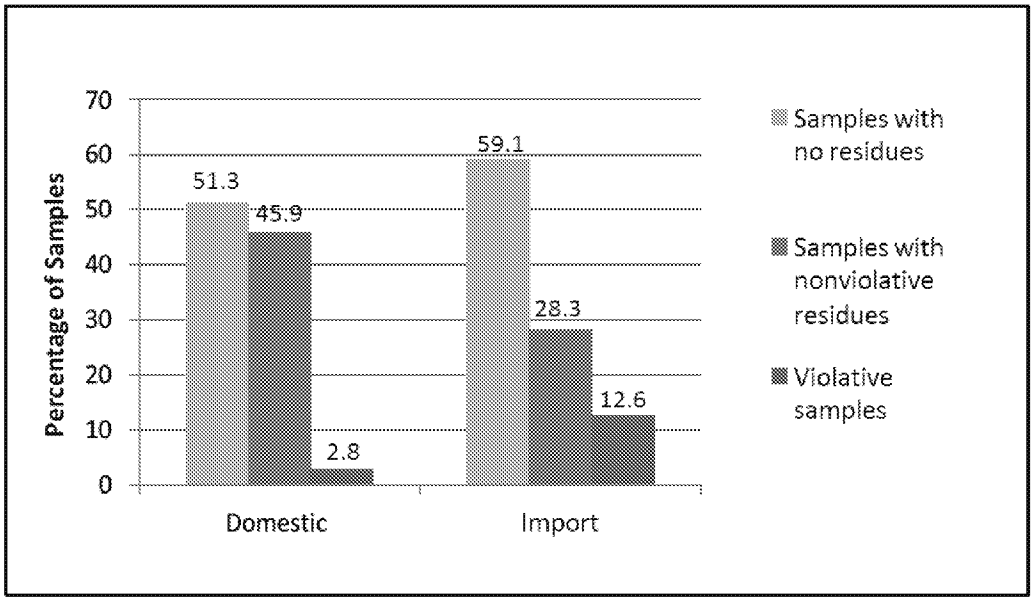
Summary

Regulatory Monitoring

A total of 8,197 regulatory samples of both domestically produced and imported food from the United States (including Puerto Rico) and 97 other countries were analyzed for pesticide residues in FY 2013. No residues were found in 51.3 % of domestic and 59.1 % of import samples (Figure 3) analyzed under FDA's regulatory monitoring approach in FY 2013. Also, 2.8 % of domestic samples and 12.6 % of import samples had violative residues levels. The findings for FY 2013 demonstrate that pesticide residue levels in foods are generally well below EPA tolerances; the increased import sample violation rate reflects the expansion of the analytical scope of pesticide residues from the implementation of new technologies implemented in FYs 2010 and 2011.

Figure 3. Summary of Results of Domestic vs. Import Food Samples

Neg = % Samples with No Residues; Pos = % Samples with Residues – No Violation; Vio = % Violative Samples



FDA also collected and analyzed 254 domestic and 166 imported animal food samples for pesticides. No residues were found in 46.5 % of the domestic animal food samples and in 59.6 % of the import animal food samples. Three domestic animal food samples and eight imported animal food samples had violative residue findings.

Total Diet Study

The FY 2013 TDS analyses showed an increase in the types and frequency of occurrence of pesticide residues in foods of the typical U.S. diet, primarily due to technological advances in testing methods. However, the levels of residues found remain below the regulatory tolerances set by EPA and the action levels for persistent organic pollutant pesticides set by FDA.

Appendices

All residue findings are summarized in the two attached appendices based upon their origin, domestic or import. In FY 2013, 212 different domestic food commodities and 810 different import food commodities and were tested. In both appendices, all commodities have been assigned to the same six commodity group categories:

Grains and Grain Products
Milk/Dairy Products/Eggs
Fish/Shellfish/Other Aquatic Products
Fruits
Vegetables
Other Food Products

Within each commodity group, the commodities are further categorized. The subcategories include commodities derived from a single agricultural commodity and commodities derived from multiple ingredients. For example, the subcategory "Wheat and wheat products" includes multiple types of whole wheat grain and several processed wheat products that contain only wheat such as milled wheat, wheat flour, wheat germ, wheat malt, wheat bran, wheat gluten, etc. Multiple-ingredient, processed-food products consisting primarily of grains are listed under separate subcategories, e.g., "Macaroni and noodles", "Breakfast cereals", etc.

Although the commodity groups are the same for both the domestic and import appendices, the subcategories are different because the numbers and kinds of individual import commodities are different than for domestic commodities. For example, over 30 "Fruit" subcategories are listed for the domestic samples, but over 70 "Fruit" subcategories are listed for the import samples.

The additional import "Fruit" subcategories are mostly for fruits not available domestically.

A. Analysis of Domestic Samples by Commodity Group in FY 2013

Commodity Group	Samples Analyzed #	Without Residues # (%)	Violative Samples* # (%)	Over Tolerance Violations #	No Tolerance Violations #
Totals - All Domestic Samples	**1,905**	**977 (51.3)**	**54 (2.8)**	**5**	**50**
Grains and Grain Products					
Bakery products, crackers, etc.	5	2 (40)	0 (0)	0	0
Barley & barley products	10	8 (80)	0 (0)	0	0
Breakfast cereals	2	2 (100)	0 (0)	0	0
Corn & corn products	15	13 (87)	0 (0)	0	0
Macaroni & noodles	0	0 (0)	0 (0)	0	0
Oats & oat products	2	2 (100)	0 (0)	0	0
Rice & rice products	5	2 (40)	0 (0)	0	0
Soybeans and soybean products	7	6 (86)	0 (0)	0	0
Wheat & wheat products	86	51 (59)	2 (2)	1	1
Other grains & grain products	1	0 (0)	0 (0)	0	0

Commodity Group	Samples Analyzed #	Without Residues # (%)	Violative Samples* # (%)	Over Tolerance Violations #	No Tolerance Violations #
Group Subtotal	**133**	**86 (64.7)**	**2 (1.5)**	**1**	**1**
Milk/Dairy Products/Eggs					
Cheese & cheese products	12	10 (83)	0 (0)	0	0
Eggs	176	169 (96)	0 (0)	0	0
Milk/cream & milk products	13	13 (100)	0 (0)	0	0
Group Subtotal	**201**	**192 (95.5)**	**0 (0)**	**0**	**0**
Fish/Shellfish/Other Aquatic Products					
Aquaculture seafood	34	22 (65)	3 (9)	0	3
Fish and fish products	40	29 (73)	0 (0)	0	0
Shellfish & Crustaceans	6	4 (67)	0 (0)	0	0
Other aquatic animals & products	0	0 (0)	0 (0)	0	0
Group Subtotal	**80**	**55 (68.8)**	**3 (3.8)**	**0**	**3**
Fruits					
Apple juice	3	0 (0)	0 (0)	0	0
Apples	196	16 (8)	1 (1)	0	1
Apricots	0	0 (0)	0 (0)	0	0
Avocadoes	9	9 (100)	0 (0)	0	0
Blackberries	5	1 (20)	1 (20)	0	1
Blueberries	26	14 (54)	0 (0)	0	0
Cantaloupe	11	7 (64)	0 (0)	0	0
Cherries	8	1 (13)	0 (0)	0	0
Citrus juice	0	0 (0)	0 (0)	0	0
Cranberries	30	7 (23)	0 (0)	0	0
Grapefruit	4	0 (0)	0 (0)	0	0
Grapes, raisins	36	3 (8)	0 (0)	0	0
Lemons	0	0 (0)	0 (0)	0	0
Nectarines	20	1 (5)	1 (5)	0	1
Oranges	5	2 (40)	0 (0)	0	0
Papaya	0	0 (0)	0 (0)	0	0
Peaches	55	5 (9)	1 (2)	1	0
Pears	35	7 (20)	0 (0)	0	0
Pineapple	0	0 (0)	0 (0)	0	0
Plums/prunes	20	9 (45)	0 (0)	0	0
Raspberries	13	1 (8)	0 (0)	0	0
Strawberries	38	9 (24)	0 (0)	0	0
Watermelon	16	7 (44)	0 (0)	0	0

Commodity Group	Samples Analyzed #	Without Residues # (%)	Violative Samples* # (%)	Over Tolerance Violations #	No Tolerance Violations #
Other citrus fruit	15	0 (0)	0 (0)	0	0
Other fruit juices	9	4 (44)	0 (0)	0	0
Other fruits/fruit products	5	0 (0)	0 (0)	0	0
Other melons	3	2 (67)	0 (0)	0	0
Other pome fruit	3	0 (0)	0 (0)	0	0
Other sub-tropical fruit	3	3 (100)	0 (0)	0	0
Processed fruit products (jellies, toppings, fillings)	1	0 (0)	0 (0)	0	0
Group Subtotal	**569**	**108 (19.0)**	**4 (0.7)**	**1**	**3**
Vegetables					
Asparagus	11	11 (100)	0 (0)	0	0
Bean sprouts	0	0 (0)	0 (0)	0	0
Bok choy	1	0 (0)	0 (0)	0	0
Broccoli	12	7 (58)	0 (0)	0	0
Cabbage	34	20 (59)	0 (0)	0	0
Carrots	37	10 (27)	1 (3)	0	1
Cauliflower	5	3 (60)	0 (0)	0	0
Celery	6	1 (17)	1 (17)	0	1
Collards	3	0 (0)	2 (67)	0	2
Corn	67	64 (96)	0 (0)	0	0
Cucumbers	34	18 (53)	1 (3)	0	1
Eggplant	14	8 (57)	1 (7)	0	1
Endive	0	0 (0)	0 (0)	0	0
Kale	15	6 (40)	3 (20)	0	3
Lettuce, head	15	7 (47)	0 (0)	0	0
Lettuce, leaf	6	4 (67)	0 (0)	0	0
Mushrooms and Truffles	17	9 (53)	0 (0)	0	0
Mustard greens	2	1 (50)	0 (0)	0	0
Okra	3	2 (67)	1 (33)	0	1
Onions/leeks/scallions/shallots	18	18 (100)	0 (0)	0	0
Parsnips	1	1 (100)	0 (0)	0	0
Peas (green/snow/sugar/sweet)	38	18 (47)	0 (0)	0	0
Peppers, hot	6	2 (33)	0 (0)	0	0
Peppers, sweet	22	7 (32)	2 (9)	0	2
Potatoes	64	19 (30)	1 (2)	1	1
Pumpkins	0	0 (0)	0 (0)	0	0
Radishes	3	1 (33)	2 (67)	0	2
Red beets	21	14 (67)	3 (14)	0	3

Commodity Group	Samples Analyzed #	Without Residues # (%)	Violative Samples* # (%)	Over Tolerance Violations #	No Tolerance Violations #
Spinach	27	8 (30)	0 (0)	0	0
Squash	71	42 (59)	3 (4)	1	2
String beans (green/snap/pole/long)	52	34 (65)	1 (2)	0	1
Sweet potatoes	13	10 (77)	0 (0)	0	0
Swiss chard	11	6 (55)	1 (9)	0	1
Tomatoes	24	14 (58)	1 (4)	0	1
Turnips	5	2 (40)	1 (20)	0	1
Other beans & peas & products	36	21 (58)	1 (3)	1	0
Other leaf & stem vegetables	34	10 (29)	12 (35)	0	12
Other root & tuber vegetables	1	0 (0)	1 (100)	0	1
Other vegetables/vegetable products	48	29 (60)	4 (8)	0	4
Group Subtotal	**777**	**427 (55.0)**	**43 (5.5)**	**3**	**41**
Other Food Products					
Almonds	1	1 (100)	0 (0)	0	0
Basil	1	1 (100)	0 (0)	0	0
Beverages & beverage base	23	9 (39)	2 (9)	0	2
Coconut	0	0 (0)	0 (0)	0	0
Confections	0	0 (0)	0 (0)	0	0
Edible seeds & seed products	2	1 (50)	0 (0)	0	0
Animal Byproducts	0	0 (0)	0 (0)	0	0
Honey	70	60 (86)	0 (0)	0	0
Peanuts & peanut products	8	7 (88)	0 (0)	0	0
Refined oil	3	3 (100)	0 (0)	0	0
Water & ice	0	0 (0)	0 (0)	0	0
Miscellaneous foods	30	23 (77)	0 (0)	0	0
Other nuts	4	3 (75)	0 (0)	0	0
Other spices	3	1 (33)	0 (0)	0	0
Other products	0	0 (0)	0 (0)	0	0
Group Subtotal	**145**	**109 (75.2)**	**2 (1.4)**	**0**	**2**

*Total number of violative samples may not equal sum of samples with "Over Tolerance" and "No Tolerance" violations because one sample can contain pesticide residues of both violation types.

B. Analysis of Import Samples by Commodity Group in FY 2013

Commodity Group	Samples Analyzed #	Without Residues # (%)	Violative Samples* # (%)	Over Tolerance Violations #	No Tolerance Violations #
Totals - All Import Samples	**6,292**	**3717 (59.1)**	**791 (12.6)**	**36**	**779**
Grains and Grain Products					
Bakery products, doughs, crackers	36	26 (72)	2 (6)	0	2
Barley & barley products	12	11 (92)	0 (0)	0	0
Breakfast cereals	7	6 (86)	0 (0)	0	0
Corn & corn products	28	23 (82)	0 (0)	0	0
Macaroni & noodles	18	9 (50)	4 (22)	0	4
Oats & oat products	4	4 (100)	0 (0)	0	0
Rice & rice products	388	218 (56)	126 (32)	1	126
Snack foods	2	1 (50)	1 (50)	0	1
Soybeans & soybean products	4	3 (75)	1 (25)	1	0
Wheat & wheat products	42	32 (76)	2 (5)	0	2
Other grains & grain products	35	26 (74)	4 (11)	0	4
Group Subtotal	**576**	**359 (62.3)**	**140 (24.3)**	**2**	**139**
Milk/Dairy Products/Eggs					
Cheese & cheese products	4	3 (75)	0 (0)	0	0
Eggs (includes duck & quail)	0	0 (0)	0 (0)	0	0
Milk/cream & milk products	10	9 (90)	0 (0)	0	0
Group Subtotal	**14**	**12 (85.7)**	**0 (0.0)**	**0**	**0**
Fish/Shellfish/Other Aquatic Products					
Aquaculture seafood	88	81 (92)	0 (0)	0	0
Fish and fish products	100	87 (87)	1 (1)	0	1
Shellfish & crustaceans	20	20 (100)	0 (0)	0	0
Other aquatic animals & products	2	2 (100)	0 (0)	0	0
Group Subtotal	**210**	**190 (90.5)**	**1 (0.5)**	**0**	**1**
Fruits					
Ackees, lychees, longans	7	6 (86)	1 (14)	0	1
Apple juice	21	16 (76)	0 (0)	0	0
Apples	29	6 (21)	2 (7)	0	2
Apricots	15	6 (40)	0 (0)	0	0
Avocadoes	9	9 (100)	0 (0)	0	0
Bananas, plantains	32	17 (53)	1 (3)	1	0
Berry juice	20	12 (60)	5 (25)	0	5

Commodity Group	Samples Analyzed #	Without Residues # (%)	Violative Samples* # (%)	Over Tolerance Violations #	No Tolerance Violations #
Bitter melon	7	3 (43)	1 (14)	0	1
Blackberries	29	8 (28)	5 (17)	0	5
Blueberries	69	31 (45)	2 (3)	1	1
Breadfruit, jackfruit	7	7 (100)	0 (0)	0	0
Cantaloupe	13	3 (23)	0 (0)	0	0
Cherries	36	6 (17)	3 (8)	0	3
Citrus juice	17	9 (53)	1 (6)	0	1
Clementines	3	0 (0)	0 (0)	0	0
Cranberries	12	7 (58)	1 (8)	0	1
Currants	0	0 (0)	0 (0)	0	0
Dates	23	18 (78)	3 (13)	0	3
Figs	7	6 (86)	0 (0)	0	0
Grapefruit	1	1 (100)	0 (0)	0	0
Grapes, raisins	65	13 (20)	6 (9)	1	5
Guavas	15	10 (67)	3 (20)	0	3
Honeydew	4	0 (0)	0 (0)	0	0
Jams, jellies, preserves, syrups, toppings from berry fruits	20	12 (60)	0 (0)	0	0
Jams, jellies, preserves, syrups, toppings from citrus fruits	5	3 (60)	0 (0)	0	0
Jams, jellies, preserves, syrups, toppings from core fruits	9	5 (56)	1 (11)	0	1
Jams, jellies, preserves, syrups, toppings from other fruits	9	9 (100)	0 (0)	0	0
Jams, jellies, preserves, syrups, toppings from pit fruits	18	14 (78)	1 (6)	0	1
Jams, jellies, preserves, syrups, toppings tropical/subtropical fruits	7	6 (86)	0 (0)	0	0
Kiwi fruit	12	8 (67)	0 (0)	0	0
Lemons	5	3 (60)	1 (20)	0	1
Limes	51	32 (63)	3 (6)	0	3
Mangoes	104	83 (80)	8 (8)	0	8
Mixed fruit juice	3	3 (100)	0 (0)	0	0
Mixed fruits	4	2 (50)	0 (0)	0	0
Nectarines	3	0 (0)	0 (0)	0	0
Olives	49	43 (88)	1 (2)	0	1
Oranges	18	9 (50)	1 (6)	0	1
Papaya	57	10 (18)	12 (21)	0	12
Peaches	27	7 (26)	3 (11)	0	3
Pear juice	2	1 (50)	0 (0)	0	0
Pears	45	12 (27)	0 (0)	0	0

Commodity Group	Samples Analyzed #	Without Residues # (%)	Violative Samples* # (%)	Over Tolerance Violations #	No Tolerance Violations #
Pepinos	2	2 (100)	0 (0)	0	0
Pineapple	56	29 (52)	1 (2)	0	1
Plums/Prunes	9	9 (100)	0 (0)	0	0
Pomegranate	2	1 (50)	0 (0)	0	0
Pomegranate juice	3	3 (100)	0 (0)	0	0
Prickle pear	37	20 (54)	11 (30)	0	11
Raspberries	53	32 (60)	8 (15)	0	8
Stone fruit juice	16	10 (63)	3 (19)	0	3
Strawberries	39	9 (23)	5 (13)	0	5
Subtropical juice/milk/nectar	43	39 (91)	0 (0)	0	0
Watermelon	8	4 (50)	0 (0)	0	0
Other berries	35	21 (60)	6 (17)	0	6
Other citrus fruit	6	3 (50)	1 (17)	0	1
Other fruit juices	8	7 (88)	0 (0)	0	0
Other fruits and fruit products	47	27 (57)	10 (21)	0	10
Other melons/vine fruit	4	1 (25)	1 (25)	0	1
Other pit fruit	4	3 (75)	0 (0)	0	0
Other pome/core fruit	2	2 (100)	0 (0)	0	0
Other sub-tropical fruit	26	22 (85)	1 (4)	0	1
Group Subtotal	**1,289**	**700 (54.3)**	**112 (8.7)**	**3**	**109**
Vegetables					
Artichokes	22	20 (91)	1 (5)	0	1
Asparagus	31	25 (81)	0 (0)	0	0
Bamboo shoots	13	13 (100)	0 (0)	0	0
Bean sprouts and seeds	4	3 (75)	0 (0)	0	0
Bok choy & Chinese cabbage	12	5 (42)	0 (0)	0	0
Broccoli	30	21 (70)	0 (0)	0	0
Brussels sprouts	13	6 (46)	2 (15)	0	2
Cabbage	9	5 (56)	1 (11)	1	0
Carrots	22	17 (77)	1 (5)	0	1
Cassava	16	14 (88)	1 (6)	0	1
Cauliflower	6	6 (100)	0 (0)	0	0
Celery	12	8 (67)	0 (0)	0	0
Choyote	18	15 (83)	1 (6)	0	1
Cilantro	48	10 (21)	16 (33)	0	16
Collards	2	2 (100)	0 (0)	0	0
Corn	28	25 (89)	0 (0)	0	0
Cucumbers	155	72 (46)	11 (7)	1	10

Commodity Group	Samples Analyzed #	Without Residues # (%)	Violative Samples* # (%)	Over Tolerance Violations #	No Tolerance Violations #
Eggplant	60	40 (67)	2 (3)	1	1
Endive	2	2 (100)	0 (0)	0	0
Garbanzo beans	24	22 (92)	1 (4)	0	1
Garlic	8	7 (88)	0 (0)	0	0
Ginger	36	34 (94)	1 (3)	0	1
Kale	22	3 (14)	3 (14)	0	3
Kidney beans	13	12 (92)	0 (0)	0	0
Leeks	14	9 (64)	0 (0)	0	0
Lettuce, head	5	4 (80)	0 (0)	0	0
Lettuce, leaf	28	15 (54)	1 (4)	0	1
Mung beans	20	15 (75)	1 (5)	0	1
Mushrooms/truffles/fungi	95	65 (68)	14 (15)	0	14
Mustard greens	2	2 (100)	0 (0)	0	0
Okra	23	11 (48)	7 (30)	0	7
Onions	10	7 (70)	0 (0)	0	0
Parsnips	0	0 (0)	0 (0)	0	0
Peas (green/snow/sweet)	64	35 (55)	(23)	2	14
Peppers, hot	641	204 (32)	92 (14)	3	92
Peppers, pimiento	9	4 (44)	0 (0)	0	0
Peppers, sweet	226	128 (57)	8 (4)	2	8
Potatoes	29	13 (45)	3 (10)	0	3
Pumpkins	6	4 (67)	0 (0)	0	0
Radishes	28	13 (46)	2 (7)	0	2
Red beets	14	13 (93)	0 (0)	0	0
Scallions & shallots	141	94 (67)	11 (8)	1	11
Soybeans	17	13 (76)	2 (12)	0	2
Spinach	52	25 (48)	11 (21)	0	11
Squash	130	101 (78)	7 (5)	1	7
String beans (green/snap/pole)	36	10 (28)	7 (19)	0	7
Sugar snap peas	37	13 (35)	13 (35)	0	13
Sweet potatoes	18	10 (56)	1 (6)	0	1
Swiss Chard	5	2 (40)	1 (20)	0	1
Taro/dasheen	25	16 (64)	9 (36)	0	9
Tomatoes/tomatillos	299	184 (62)	11 (4)	1	10
Turnips	5	4 (80)	0 (0)	0	0
Vegetable juice/drinks	6	6 (100)	0 (0)	0	0
Vegetables with sauce	22	13 (59)	3 (14)	2	3
Vegetables, breaded	0	0 (0)	0 (0)	0	0
Vegetables, other, mixed	89	68 (76)	5 (6)	1	5

Commodity Group	Samples Analyzed #	Without Residues # (%)	Violative Samples* # (%)	Over Tolerance Violations #	No Tolerance Violations #
Water chestnuts	5	5 (100)	0 (0)	0	0
Other beans & pea products	95	59 (62)	10 (11)	2	9
Other cucurbit vegetables	6	5 (83)	0 (0)	0	0
Other leaf & stem vegetables	135	67 (50)	22 (16)	2	22
Other root & tuber vegetables	29	15 (52)	3 (10)	1	3
Animal byproducts	1	0 (0)	0 (0)	0	0
Baby foods/formula	3	2 (67)	0 (0)	0	0
Group Subtotal	**2,972**	**1639 (55.1)**	**300 (10.1)**	**21**	**294**
Other Food Products					
Animal byproducts	1	0 (0)	0 (0)	0	0
Baby foods/formula	3	2 (67)	0 (0)	0	0
Beverage and beverage bases	26	21 (81)	2 (8)	0	2
Candy, confections, chocolate, cocoa products	18	15 (83)	0 (0)	0	0
Coconut & coconut products	14	14 (100)	0 (0)	0	0
Coffee	18	18 (100)	0 (0)	0	0
Coffee/tea substitutes	5	1 (20)	4 (80)	0	4
Condiments & dressings	8	5 (63)	1 (13)	0	1
Dietary supplement, Astragalus	0	0 (0)	0 (0)	0	0
Dietary supplement, Echinacea	9	5 (56)	4 (44)	0	4
Dietary supplement, other botanical/herbal, not tea	268	157 (59)	81 (30)	6	80
Dietary supplement/tea, Ginseng	1	1 (100)	0 (0)	0	0
Dietary supplement/tea, Kava	0	0 (0)	0 (0)	0	0
Dietary supplement/tea, Senna	0	0 (0)	0 (0)	0	0
Dietary supplement, other (not botanicals/herbals or teas)	45	29 (64)	7 (16)	0	7
Flavorings and extracts	4	4 (100)	0 (0)	0	0
Food additives/colors	1	0 (0)	0 (0)	0	0
Food sweeteners, not honey	17	16 (94)	0 (0)	0	0
Honey & honey products	63	58 (92)	2 (3)	0	2
Multi-ingredient foods (dinners, sauces, specialties)	46	21 (46)	11 (24)	0	11
Nuts, almonds	8	8 (100)	0 (0)	0	0
Nuts, cashews	27	26 (96)	0 (0)	0	0
Nuts, other nuts & nut products	9	9 (100)	0 (0)	0	0
Nuts, peanuts & peanut products	13	8 (62)	1 (8)	1	0
Nuts, pecans	11	11 (100)	0 (0)	0	0
Nuts, pistachios	2	1 (50)	0 (0)	0	0

Commodity Group	Samples Analyzed #	Without Residues # (%)	Violative Samples* # (%)	Over Tolerance Violations #	No Tolerance Violations #
Oil seed stock	1	1 (100)	0 (0)	0	0
Pepper sauce	16	3 (19)	2 (13)	0	2
Seeds, pumpkin	6	4 (67)	0 (0)	0	0
Seeds, sesame	7	6 (86)	0 (0)	0	0
Seeds, sesame paste	6	5 (83)	1 (17)	0	1
Seeds, sunflower	3	3 (100)	0 (0)	0	0
Seeds, other edible seeds & seed products	32	28 (88)	1 (3)	0	1
Soybeans, edible	10	7 (70)	0 (0)	0	0
Spices, basil	31	10 (32)	19 (61)	0	19
Spices, capsicums	58	16 (28)	32 (55)	0	32
Spices, other	91	50 (55)	27 (30)	3	27
Spices, paprika	22	1 (5)	14 (64)	0	14
Tea	12	4 (33)	4 (33)	0	4
Tea, botanical/herbal, other	25	21 (84)	3 (12)	0	3
Vegetable oil, crude	139	102 (73)	15 (11)	0	15
Vegetable oil, refined	133	111 (83)	6 (5)	0	6
Vegetable oil products	1	1 (100)	0 (0)	0	0
Water & ice	5	5 (100)	0 (0)	0	0
Other food products	11	5 (45)	1 (9)	0	1
Other non food items	5	4 (80)	0 (0)	0	0
Group Subtotal	**1,231**	**817 (66.4)**	**238 (19.3)**	**10**	**236**

*Total number of violative samples may not equal sum of samples with "Over Tolerance" and "No Tolerance" violations because one sample can contain pesticide residues of both violation types.